

REMARKS

I. Priority

The Examiner has not acknowledged Applicants' claim to foreign priority or receipt of the certified copy of the priority document from the International Bureau. However, Applicants note that a certified copy of the priority application No. FI20031902, filed December 23, 2003 was received from the International Bureau and is present in the Image File Wrapper (IFW) on the PTO's PAIR website for the present application. Applicants respectfully request the Examiner to formally acknowledge Applicants' claim for foreign priority and receipt of the certified copy of the priority document in the next Action.

II. Response to Obviousness-Type Double Patenting Rejections

In paragraph 4 of the Office Action, claims 1-22 are provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 3, 8, 15, 16-25 and 29-31 of co-pending Application No. 10/583,712 (U.S. Pub. No. 2007/0130362).

In paragraph 5 of the Office Action, claims 1-9 and 11-22 are provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claim 1, 3-9, 16-19 and 21-26 of co-pending Application No. 10/583,849 (U.S. Pub. No. 2007/0143932).

In paragraph 6 of the Office Action, claims 1-4, 7-9 and 11-22 are provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 2, 3, 7 and 8 of co-pending Application No. 10/583,711 (U.S. Pub. No. 2007/0151679).

A Terminal Disclaimer is being submitted herewith, thereby obviating the objection.

Accordingly, Applicants respectfully request withdrawal of the provisional obviousness-type double patenting rejections.

III. Response to Claim Rejection under 35 U.S.C. § 112, 1st Paragraph

Claim 21 is rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. The Examiner states that the claim states that radiation capable of oxidizing the fibrous material should be used however, neither the specification nor the claim state in any manner how much radiation is needed; where and when the radiation is used on the fibrous material (low consistency, medium consistency, or once a sheet has been formed); and it is not clear whether the radiation requires or does not require the other oxidizing agents (the enzymes, peroxides etcetera)

Applicants traverse the rejection.

The test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation. A patent need not teach, and preferably omits, what is well known in the art.

In this case, the specification discloses at page 7, lines 11-13, that radical forming radiation comprises gamma radiation, electron beam radiation or any high energy radiation capable of forming radicals in a lignocellulose or lignin containing material. One of ordinary skill in the art is capable of adjusting the radiation such that radicals are created in the fibrous material. Therefore, the specification is sufficiently enabling to those of ordinary skill in the art.

Accordingly, Applicants request withdrawal of the §112, 1st paragraph rejection.

IV. Response to Claim Rejections under 35 U.S.C. § 112, 2nd Paragraph

Claims 6, 7, 10, 11, 17, 18 and 21 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite.

Regarding claim 6, the phrase “preferably” is said to render the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention.

Regarding claim 7, the Examiner states that it is not clear what changes can or cannot be made to the functional group to be considered a “derivative” or a completely different functional group. Therefore the Examiner states that the proper metes and bounds of patent protection desired cannot be determined.

With respect to claim 10, the Examiner states that it is not clear what changes can or cannot be made to the compound to be alkyl considered a derivative of eugenol, isoeugenol and gallate or a completely compound. The Examiner states that ferulic acid, for example, could be considered a derivative of eugenol as it has an additional carbonyl group attached to the end of the chain; and it is unclear whether this compound fits Applicants’ definition of “derivative”.

Regarding claim 11, the phrase "or such" is said to render the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention.

Claim 17 is rejected for reciting both a broad range and narrow range in the same claim. Specifically, the Examiner states that claim 17 recites the broad recitation 1100,000 nkat/g, and also recites 10-500 nkat/g which is the narrower statement of the range/limitation. The claim also states the limitation .00001 to 10 mg of enzyme per gram of dry matter which the Examiner states is a third range.

Further, with respect to claim 17, the Examiner states that the enzyme dosage, “nkat/g”, is interpreted as referring to enzyme activity on pulp. However, the Examiner states that

Applicants do not state what the defined assay conditions are for measuring the enzyme activity and therefore the Examiner cannot determine the proper metes and bounds of the claim since an enzyme can have different activity at different temperatures, pHs and depending on the substrate being oxidized.

Regarding claim 18, the phrase “such as” is said to render the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention.

Claims 6, 11, 17 and 18 are amended herein by deleting improper phrases and by adding new claims directed to the deleted subject matter.

With respect to claims 7 and 10, references to “derivatives” are deleted.

Regarding the recitation of the amount of 0.0001 to 10 mg protein/g of dry matter in claim 17, Applicants submit that this range is a separate range from the enzyme dosage and therefore is not a narrower range of the enzyme dosage. Thus, Applicants traverse this grounds for rejection and submit that one of ordinary skill in the art is readily apprised of the meaning and scope of the claim.

With respect to claim 18, the activation treatment is described at page 8, lines 4-6.

Specifically it states:

The activation treatment is carried out at a temperature in the range of 5 to 90 °C, typically about 10 to 85 °C. Normally, ambient temperature (room temperature) or a slightly elevated temperature (20 – 80 °C) is preferred. The pH is 2 – 12 and consistency 0.5 - 95%.

Also the conditions for determining enzyme activity are described in the working examples (see e.g., Examples 4-6). Thus, the specification provides sufficient information for determining the conditions at which enzyme activity is measured.

In view of the above, Applicants respectfully request withdrawal of the §112, 2nd paragraph rejections.

V. Response to Claim Rejection under 35 U.S.C. § 112, 2nd Paragraph and under 35 U.S.C. § 101

In paragraph 19, claim 21 is rejected under 35 U.S.C. § 112, 2nd paragraph. The Examiner states that claim 21 provides for the use of radiation, but does not set forth any steps involved in the method/process and therefore it is unclear as to what method /process Applicants intend to encompass.

Claim 21 is further rejected under 35 U.S.C. § 101 as being an improper use claim allegedly because of the recitation of a use without setting forth any steps involved in the process.

Claim 21 is amended herein to recite that oxidizing step comprises radiating the lignocellulosic fibre matrix employing radical forming radiation capable of catalyzing the oxidation of phenolic or similar structural groups to provide an oxidized fibre material, thereby obviating the rejections.

Accordingly, Applicants respectfully request withdrawal of the rejections.

VI. Response to Claim Rejections under 35 U.S.C. § 103

A. Claims 1-22

Claims 1-22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over US 6,187,136 to Pederson et al (hereinafter “Pederson”) in view of WO 00/78818 to Betremieux et al (hereinafter “Betremieux”) as evidenced by Handbook for Pulp and Paper Technologists by Smook (hereinafter “Smook”) (copy attached to this letter), or in the alternative, Betremieux in view of Pederson as evidenced by Smook.

US 6,830,657 is referred to in the Action and herein as the English language equivalent of the French WO publication to Betremieux.

In view of the above please advise if the proposed claim amendments are acceptable and provide Applicants’ comments and instructions for responding to the rejection of claim 18 with regard to the measurement of enzyme activity.

Applicants respectfully traverse the rejection.

Applicants submit that the reasoning presented by the Examiner reflects improper hindsight and is partially erroneous.

As recited in claim 1, the present invention relates to the activation of fibres by oxidation and the addition of a hydrophobic component (i.e., the modifying component) to the activated fibre via the radical mechanism. Then the hydrophobic fibre is more compatible with the thermosetting or thermoplastic polymers.

On the other hand, Pedersen relates to increasing negative charges and about an increase in adsorbing the fibres with paper making polymers, caused by said charges - i.e., adsorption caused by the charge. Specifically, Pedersen discloses increasing a property already present in

the fibre, whereas the present invention creates properties which are alien to (or at least not present in) the fibres, such as hydrophobicity. A fibre is normally hydrophilic, which means that it adsorbs water. Since this is the case, it is difficult to combine the fibres with hydrophobic materials such as thermoplastic polymers.

Betremieux et al disclose the production of a dispersion of a sizing agent and the utilization thereof in the sizing of paper. In Betremieux et al, maleic acid anhydride is used for attaching hydrophobic polymers to fibres. Applicants submit that maleic acid anhydride is known for non-specifically bonding to all hydroxyl groups present in a substrate. Maleic acid is generally used as a compatibilizer for acrylates.

Thus, Applicants submit that although Betremieux et al relate to the bonding of polymers to fibres, a person skilled in the art would know the difference between the different reaction mechanisms and would not be motivated to apply the teachings of Betremieux et al to Pedersen. Betremieux et al uses a highly reactive compound, whereas Pedersen uses an enzymatic compound. The Betremieux et al reagent is used for coupling of polymers to hydroxyl groups, whereas Pedersen increases the negative charge of the fibre.

Since Betremieux et al is based on a quite different mechanism than Pedersen, there is no reason why a person would use a technique based on the use of a highly reactive and non-specifically acting compatibilizer of the maleic acid anhydride type for attaching polymers to fibres. In the present invention, the fibres are made hydrophobic by specifically oxidating phenolic groups. Pedersen suggests making the fibres more negative. The present invention is based on a highly specific enzymatic way of making the fibres suitable for bonding of polymers, Betremieux et al is using a highly non-specific chemical reagent for linking polymers.

As disclosed at page 8, lines 15-17 of the present specification, the hydrophobic component of the claimed composite is a thermoplastic or thermosetting polymer. None of the Pedersen, Betremieux et al nor Smook teaches or suggests a thermoplastic or thermosetting polymer as the hydrophobic polymer component. Also, it such a modification would not have been desirable since the references are related to paper for writing. See, e.g., column 1, lines 26-26 of Pedersen and column 1, lines 17-19 of Betremieux. Thus, the desired properties of the composite of the present invention are significantly different from those of the products taught by the cited references.

In view of the above, the present invention is not rendered obvious by the cited references, whether taken alone or in combination. Accordingly, Applicants respectfully request withdrawal of the rejection.

B. Claims 10 and 14

Claims 10 and 14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Pederson in view of Betremieux as evidenced by Smook, or in the alternative, Betremieux in view of Pederson as evidenced by Smook as applied to claim 1, and further in view of Call.

Applicants traverse the rejection for the reasons set forth above and further in view of the following.

The Pedersen patent discloses phenolic compounds having a negative charge. In the present invention, one of the functional groups is phenolic and the other is of a kind which brings hydrophobicity to the fibrous mass (in particular an aliphatic part). In other words, there is a different aim and different functional group. In the Call reference a method of delignifying fibrous material with a mediated oxidation is described. The mediators described by Call are not meant to stick to the fibres. There is no mention in the text of Call or any indication of "bound to

fibres"). Rather, the aim is of Call is to improve oxidation (in practice not even desirable in delignification of fibres during pulping). There is no apparent reason why a person skilled in the art would have combined the references as suggested by the Examiner and would thereby have arrived at the present invention.

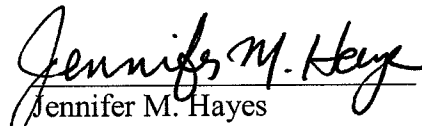
Accordingly, Applicants respectfully request withdrawal of the rejection.

VII. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,


Jennifer M. Hayes
Registration No. 40,641

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

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